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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,229	11/26/2003	Wei Fan	YOR920030429US1 (8728-651)	9160
46069 7590 04/20/2007 F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			EXAMINER BELL, CORY C	
			ART UNIT 2164	PAPER NUMBER

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/20/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/723,229

Applicant(s)

FAN ET AL.

Examiner

Cory C. Bell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 3/22/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-12 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/21/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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### **DETAILED ACTION**

Claims 1-12, and 15 have been examined.

#### ***Requirement for Information***

Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

It is requested that the applicant provide reference [19] of "An Index Structure for Pattern Similarity Searching in DNA Microarray Data" co-authored by the applicants. Titled "Indexing weighted-sequences in large databases" Published February 2002

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

#### ***Response to Arguments***

1. The declaration under 37 CFR 1.132 filed 9/21/2006 is insufficient

The evidence of record contains contradictory information. The listing of the graduate student's names suggests a contribution at least equivalent to Philip S. Yu, who is a listed inventor, as he is listed prior to Mr. Yu in the authorship, as authorship is usually listed in order of contribution

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(See Author(s) on page 3 of the document from the IEEE webpage). The IEEE also states the following about Authorship:

The IEEE affirms that authorship credit must be reserved for individuals who have met each of the following conditions:

- a. Made a significant intellectual contribution to the theoretical development, system or experimental design, prototype development, and/or the analysis and interpretation of data associated with the work contained in the manuscript;
- b. Contributed to drafting the article or reviewing and/or revising it for intellectual content; and
- c. Approved the final version of the manuscript as accepted for publication, including references.

Col 1 of page 3 of the reference in question also clearly states, "we motivate our work."

The statement that Sanghyun Park was a graduate student is also contradicted by the affidavit file in application 10/723, 206, signed by Haixun Wang, Wei Fan, and Philip S. Yu, in which it is stated that Sanghyun Park was a post-doctoral employee of IBM. Haixun Wang's resume as archived 3/21/2006 indicates the Mr. Park was an assistant professor at POSTECH.

This contradiction leads to a conclusion of insufficient evidence, although, this might be resolved by providing more information from the "graduate student" himself/herself as to degree and nature of the contribution.

2. As per the rejection of claim 15 under 35 USC 101, the rejection stands as the claim still fails to provide a useful concrete and tangible result. Although the claim has been amended, the claim still fails to positively recite the act of executing the steps of the method to generate a useful concrete and tangible result.

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3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 15 is rejected under 35 U.S.C. 101. The fact that the instructions are executable by a processor does not mean that the instructions are processed. Thus, claim 15 cannot produce a useful concrete and tangible result if the instructions are not executed, as no result will be produced.

*Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-8, 12 and 15 rejected under 35 U.S.C. 102(b) as being Clearly Anticipated by “An Index Structure for Pattern Similarity Searching in DNA Microarray Data”.

6. *As per Claims 1 and 15,*

receiving a sequence; {Section 2 “Weighted Sequences”}

receiving a window size; {Section 3.2}

encoding the sequence into a weighted-sequence; {Section 2}

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encoding the weighted sequence into one or more one-dimensional sequences, {Section 3.2}  
wherein the length of each of the one or more one-dimensional sequences is less than the  
window size; {Section 3.2} inserting each of the one or more one-dimensional sequences into a  
trie structure; {Section 3.2}

and generating the index, comprising:

generating a current sequential ID and a maximum sequential ID pair for generating each of the  
one or more trie nodes, wherein the current sequential ID of any descendant of a given trie node  
is between the current sequential ID of the given trie node and the maximum sequential ID;  
{Section 3.2}

generating an iso-depth link for each unique symbol in each of the one or more one-dimensional  
sequences, wherein the iso-depth link comprises trie nodes under the symbol; {Section 3.2} and  
generating an offset list comprising an original position of each of the one or more subsequences  
in the weighted-sequence. {Section 3.2}

7. *As per Claim 2,*

2. The method of claim 1, wherein encoding the sequence into a weighted-sequence comprises  
encoding the sequence with weights represented by real numbers; {section 2, page 6 col 2}

8. *As per Claim 3,*

3. The method of claim 2, wherein encoding the sequence with weights represented by real numbers, comprises discretizing the sequence into a number of equi-width units. {Section 3.2 page6 col 2}

9. *As per Claim 4,*

4. The method of claim 1, wherein inserting each of the one or more one-dimensional sequences into a trie structure comprises using a depth-first traversal. {Section 3.2}

10. *As per Claim 5,*

5. The method of claim 1, wherein creating the weighted-sequences index, wherein the weighted-sequences index comprises an iso-depth index, wherein the iso-depth index is a one-dimensional buffer. (Section 3.2)

11. *As per Claim 6,*

6. The method of claim 1, wherein creating the weighted-sequences index, wherein the weighted-sequences index comprises an iso-depth index, wherein the iso-depth index is a B.sup.+ tree.

(Figure 4)

12. *As per Claim 7,*

7. The method of claim 1, wherein creating the weighted-sequences index, wherein the weighted-sequences index comprises an iso-depth index, wherein the iso-depth index is a linked list.

(Figure 5)

13. *As per Claim 8,*

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8. The method of claim 1, wherein receiving a sequence comprises receiving one or more elements in the sequence, wherein each of the one or more elements are represented by one or more (symbol, weight) pairs. {Section 2}

14. *As per Claim 12,*

12. The method of claim 1, wherein receiving a sequence comprises receiving one or more scientific datasets, transforming each of the one or more scientific datasets into one or more sequence, concatenating the one or more sequences to form a long sequence. {Section 4}

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

16. Claims 1-12 and 15 rejected under 35 U.S.C. 102(a) as being Clearly Anticipated by “Indexing Weighted-Sequences in Large Databases”.

17. *As per Claims 1 and 15,*

receiving a sequence; {Section 3 “Weighted Sequences”}

receiving a window size; {Section 5.1 Para 2}

encoding the sequence into a weighted-sequence; {Section 3}



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encoding the weighted sequence into one or more one-dimensional sequences, {Section 5.2 Para 3} wherein the length of each of the one or more one-dimensional sequences is less than the window size; {Section 5.2 Para2} inserting each of the one or more one-dimensional sequences into a trie structure; {Section 5.2 Para 5}

and generating the index, comprising:

generating a current sequential ID and a maximum sequential ID pair for generating each of the one or more trie nodes, wherein the current sequential ID of any descendant of a given trie node is between the current sequential ID of the given trie node and the maximum sequential ID;  
{Section 5.2 Para 6}

generating an iso-depth link for each unique symbol in each of the one or more one-dimensional sequences, {Section 5.2 Para 8} wherein the iso-depth link comprises trie nodes under the symbol; {Section 5.2 Para 8 and Section 5.2 Paras 1 and 2} and

generating an offset list comprising an original position of each of the one or more subsequences in the weighted-sequence. {Section 5.2 Para 5}

18. *As per Claim 2,*

2. The method of claim 1, wherein encoding the sequence into a weighted-sequence comprises encoding the sequence with weights represented by real numbers; {Section 5.1 Para 3}

19. *As per Claim 3,*

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3. The method of claim 2, wherein encoding the sequence with weights represented by real numbers, comprises discretizing the sequence into a number of equi-width units. {Section 5.1 Para 3}

20. *As per Claim 4,*

4. The method of claim 1, wherein inserting each of the one or more one-dimensional sequences into a trie structure comprises using a depth-first traversal. {Section 5.2 Para 6}

21. *As per Claim 5,*

5. The method of claim 1, wherein creating the weighted-sequences index, wherein the weighted-sequences index comprises an iso-depth index, wherein the iso-depth index is a one-dimensional buffer. (Section 5.3)

22. *As per Claim 6,*

6. The method of claim 1, wherein creating the weighted-sequences index, wherein the weighted-sequences index comprises an iso-depth index, wherein the iso-depth index is a B.sup.+ tree.  
(Section 5.2 para 8)

23. *As per Claim 7,*

7. The method of claim 1, wherein creating the weighted-sequences index, wherein the weighted-sequences index comprises an iso-depth index, wherein the iso-depth index is a linked list.  
(Section 5.2 para 6 and section 5.3)

24. *As per Claim 8,*

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8. The method of claim 1, wherein receiving a sequence comprises receiving one or more elements in the sequence, wherein each of the one or more elements are represented by one or more (symbol, weight) pairs. {Section 3 Para 5}

25. *As per Claim 9,*

9. The method of claim 8, wherein receiving one or more elements in the sequence, wherein each of the one or more elements are represented by one or more (symbol, weight) pairs, and wherein each of the symbol elements of the one or more (symbol, weight) pairs correspond to a non-uniform frequency distribution. {Section 1 "Our Contributions" 3<sup>rd</sup> bullet point}

26. *As per Claim 10,*

10. The method of claim 9, further comprising reordering the one or more one-dimensional sequences prior to inserting each of the one or more one-dimensional sequences into a trie structure using the non-uniform frequency distribution to generate a new sequence. {Section 1 "Our Contributions" 3<sup>rd</sup> bullet point}

27. *As per Claim 11,*

11. The method of claim 10, wherein reordering the one or more one-dimensional sequences prior to inserting each of the one or more one-dimensional sequences into a trie structure using the non-uniform frequency distribution to generate one or more new sequences, comprises: (a) adding an offset  $2*w*r$  to each weight element of the one or more one-dimensional sequences, wherein  $w$  is a window size,  $r$  is a rank a symbol to generate a new weight; (b) sorting the each element of the one or more one-dimensional sequences by the new weight; (c) placing a moving

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window of size  $2*w*A$  on the one or more new sequences, wherein A is the total number of the symbols; and (d) indexing the one or more new sequences in a new window. {Section 6 Para 9}

28. *As per Claim 12,*

12. The method of claim 1, wherein receiving a sequence comprises receiving one or more scientific datasets, transforming each of the one or more scientific datasets into one or more sequence, concatenating the one or more sequences to form a long sequence. {Section 4}

### ***Conclusion***

This Office action has an attached requirement for information under 37 CFR 1.105. A complete reply to this Office action must include a complete reply to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cory C. Bell whose telephone number is (571) 272 2736. The examiner can normally be reached on m-f 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Rones can be reached on (571) 272 4085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**CHARLES RONES**  
**SUPERVISORY PATENT EXAMINER**